Memorandum of Understanding
between the
Landsat 7 Processing System (LPS)
and the
Landsat 7 Mission Operations Center (MOC)

October 1995

Review:

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1.0 Purpose

The purpose of this Memorandum of Understanding (MOU) is to provide complete documentation of the interface between the Landsat 7 Processing System (LPS) and the Landsat 7 Mission Operations Center (MOC).

1.1 Reference Documents

1. NASA GSFC/MO&DSD, Mission Operations Center (MOC) Functional and Performance Specification (F&PS), TBD

2. NASA GSFC/MO&DSD, Landsat 7 Processing System (LPS) Functional and Performance Specification (F&PS), 560-8FPS/0194, July, 1995.

3. NASA GSFC/MO&DSD, Landsat 7 Processing System (LPS) System Design Specification (SDS), 560-8SDS/0194, February 28, 1994.

4. National Aeronautics and Space Administration (NASA) Goddard Space Flight Center (GSFC) Landsat 7 Detailed Mission Requirements, May 1995.

5. NASA GSFC/MO&DSD, Mission Operations Concept Document for the Landsat 7 Ground System. TBD

6. NASA GSFC/MO&DSD, Landsat 7 Processing System (LPS) Output Files Format Control Document, TBD

7. NASA GSFC/MO&DSD, Interface Control Document Between EOSDIS Core System (ECS) and the Landsat 7 System, 209-CD-013-001, TBD

2.0 Interface Description

The LPS shall provide the MOC with a data capture summary on a per contact basis. In addition, the LPS shall notify the MOC of anomalous return link quality and accounting information which is detected during post-pass processing.

2.1   LPS Responsibilities

There are between 5-6 data acquisition sessions at the Earth Resources Observation System (EROS) Data Center (EDC) during a given day. Within five minutes of the completion of each capture

session, the LPS operator shall notify the MOC operations personnel of the capture summary. This information includes:

Number of Bytes Captured
Approximation of the Number of Scenes Captured
Data Capture Start/Stop Times

In addition, any anomalies experienced during data capture, such as: loss of connection with the Landsat 7 Ground Station (LGS), or late data capture start or premature capture termination based on the contact schedule shall be reported to the MOC.

Note the data capture times are indicative of when the LPS begins to capture data to disk and when the LPS closes the captured data file. They are not necessarily the Acquisition of Signal (AOS) and Loss of Signal (LOS) which will be detected by the LGS.

The LPS operators will schedule the post pass processing to Level 0R data at an appropriate time. During data processing, return link quality and accounting statistics will be gathered on a contact period basis. The LPS operator shall notify the MOC of the quality and accounting information.

Return Link Quality and Accounting information to be passed to the MOC upon anomalous conditions includes:

LPS Sting Identifier
Contact Period Start and Stop Times
Channel Access Data Unit (CADU) Synchronization information (polarity, synchronization strategy and bit slips)
Count of CADUs with synchronization errors
Count of received CADUs
Count of flywheel CADUs
Count of correctable Virtual Channel Data Unit (VCDU) headers, by VCDU identifier
Count of uncorrectable VCDU headers
Count of CADUs with Bose-Chaudhuri-Hocquenghem (BCH) errors corrected for the mission data zone in the VCDU
Count of CADUs with BCH errors uncorrected for the mission data zone in the VCDU
Count of CADUs with Cyclic Redundancy Check (CRC) errors
Approximate amount of wideband data received in megabytes
Approximation of number of major frames received

Approximate number of Enhanced Thematic Mapper + (ETM+) scenes received
Approximate Bit Error Rate (BER) based on BCH detected and/or CRC bit errors

The LPS shall initiate contact with the MOC whenever any of the CADU/raw data related quality parameters exceeds a predetermined threshold, thus deemed anomalous. This threshold will be established and modified during operations as deemed necessary.

2.2   MOC Responsibilities

The MOC shall be capable of receiving the information described in section 2.2.

In addition, the MOC shall receive LPS generated metadata from the Earth Observation Data Information System (EOSDIS) Core System (ECS) which contains the return link quality and accounting information, and level 0R quality and accounting information for each subinterval and scene, including cloud cover information for each scene. These metadata formats are documented in the LPS Output Files Format Control Document and the interface to the ECS is documented in the ECS-Landsat 7 ICD and is not covered further in this MOU. The MOC will utilize the metadata information for inputs to the image scheduling.

3.0 Interface Medium

The mechanism for the MOC-LPS interface is voice or facsimile, preferably voice. No other type of electronic interface is required.

4.0 Operational Procedures

The following sections discuss the operational procedures associated with this interface.

4.1 Nominal Data Summary Reporting

During the capture of data, the LGS, LPS, and MOC operations will be in voice contact. At the culmination of the acquisition session, the LPS operator will report the capture statistics to the MOC. These statistics will be displayed to the operator periodically during the capture session and a summary will be generated at the end of the session. Under nominal circumstances, this will be the only LPS statistics necessary to support the LPS-MOC interface. Post pass return link quality and accounting information will only be reported in anomalous conditions as described in section 4.2.

4.2 Anomaly Handling

Upon detection of anomalous return link quality and accounting information, the LPS operator will notify the MOC operator of the problem. The preferred interface mechanism is voice. An anomalous condition is whenever any of the CADU/raw data related quality parameters exceeds a predetermined threshold, thus deemed anomalous. This threshold will need to be determined and updated during the mission life.

Acronym List

AOS	Acquisition of Signal
BCH	Bose-Chaudhuri-Hocquenghem
BER	Bit Error Rate
CADU	Channel Access Data Unit
ECS	EOSDIS Core System
EDC	EROS Data Center
EOSDIS	Earth Observation Data Information System
EROS	Earth Resources Observation System
ETM+	Enhanced Thematic Mapper +
GSFC	Goddard Space Flight Center
LGS	Landsat 7 Ground Station
LPS	Landsat 7 Processing System
MOC	Mission Operations Center
MO&DSD	Mission Operations and Data Systems Directorate
MOU	Memorandum of Understanding
NASA	National Aeronautics and Space Administration
VCDU	Virtual Channel Data Unit